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Kennedy Space Center



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Study of Nondestructive Techniques for Redundancy Verification

The problem of verifying the operational integrity of systems such as communication equipment and other electronic circuitry containing redundant functional elements was recently studied. These elements, together with the basic elements of the system, constitute a redundant system with a primary and backup (or alternative) capability for performing its particular functions with increased reliability. A major purpose of the study was to develop nondestructive procedures for automated, continuous, redundancy verification (i.e., procedures whereby the presence or absence of effective redundancy can be verified without manual intervention).

A number of redundant circuits were analyzed, and the characteristics which determine adaptability to verification were identified. Mutually exclusive and exhaustive categories for verification techniques were established, and the range of applicability of these techniques was defined in terms of signal characteristics and redundancy features. Verification approaches were discussed, and a methodology for the design of redundancy systems was described.

The new methodology was applied to a case

which involved the design of a verification system for a hypothetical complex communication system. Recommendations for the development of technological areas pertinent to the goal of increased verification capabilities were presented.

Note:

The following documentation may be obtained from:

National Technical Information Service
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(or microfiche \$0.95)

Reference:

NASA-CR-111765 (N71-13900), Study of
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Without Disrupting Systems

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No patent action is contemplated by NASA.

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